PATENT ABSTRACTS OF JAPAN

(11)Publication number : 10-128902

(43)Date of publication of application : 19.05.1998

(51)Int.Cl. B32B 13/04
B32B 33/00

(21)Application number : 08-307017

(22)Date of filing : 01.11.1996

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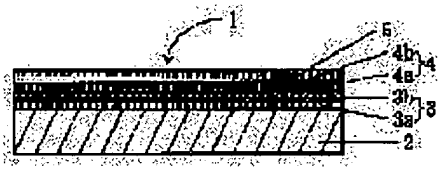
(54) INORGANIC DECORATIVE BOARD HAVING EXCELLENT ANTI-FOULING PROPERTY AND PRODUCTION METHOD THEREOF

(57)Abstract:

PROBLEM TO BE SOLVED: To suppress the generation of peel-off when being applied in the kitchen, such as a sink and a gas range, and improve the flame-preventing property by successively laminating a base coat layer, a picture printing layer, and a top coat layer made from a thermosetting resin paint containing a fluoric group on an inorganic substrate.



SOLUTION: An inorganic decorative board 1 is formed by laminating a picture printing layer 4 and a top coat layer 5 via a base coat layer provided on the surface of an inorganic substrate 2. The picture printing layer 4 comprising a solid ink layer 4a and a picture ink layer 4b is formed on the surface of the base coat layer comprising a sealer layer 3a and a primer layer 3b provided on the upper surface of the inorganic substrate 2 with a transfer method. Further, a top layer 5 is formed with a thermosetting resin paint containing a fluoric group on the upper surface of the picture printing layer 4. Examples of the inorganic substrate 2 include cement boards such as a calcium silicate board, a asbestos slate board, and a lightweight foamed concrete board and gypsum boards such as a gypsum board and a gypsum slag board.

LEGAL STATUS

[Date of request for examination] 28.08.2003

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to construction interior material, the minerals system panel which is especially used for the circumference of chitins, such as a sink and a gas range, and which has good antifouling property, and its manufacture approach.
[0002]
[Description of the Prior Art] As a minerals system panel used for the circumference of chitins, such as a sink and a range, conventionally To minerals system base materials, such as a calcium silicate board, an asbestos cement sheet plate, and a cement slate plate For example, the approach of sticking the tissue with which the printing pattern was formed, the approach of printing a pattern pattern to a direct minerals system base material, Or although what painted the transparence coating from on this pattern encaustic layer, and was used as the topcoat layer is known after prepar a pattern encaustic layer in a minerals system base material side by the approach of imprinting a pattern pattern etc. using an imprint sheet When used for the circumference of chitins, such as a sink and a gas range, seasonings, such a lamp soot or soy sauce, the source, and Calais, dispersed, it adhered to the surrounding wall surface and there was a fault that it could be hard to take dirt and the dirt which becomes empty and which moreover adhered.
[0003] In order to solve the above-mentioned fault, after preparing a pattern pattern in the front face of a minerals system base material by the approach of imprinting a pattern pattern etc., the thing using thermosetting resin and ionizing-radiation hardenability resin as a transparence coating for topcoat layers is used as a thing excellent in surfa physical properties, such as surface hardness, abrasiveness, resistance to contamination, and abrasion-proof nature. However, although the thing using thermosetting resin and ionizing-radiation hardenability resin as said topcoat laye could remove almost all dirt when it got wet in removal of dirt and a dustcloth and a detergent were used, in wiping with dry cloth which is the simplest smear method, dirt remained and it had the problem of being inferior to antifouli property.
[0004]
[Problem(s) to be Solved by the Invention] It is offering the minerals system panel excellent in the antifouling prope which can remove the dirt which this invention's is made in view of this problem, the place made into the purpose ha very little generating of exfoliation even if it uses for the circumference of chitins, such as a sink and a gas range, an has thermal resistance and firesafety-proof, and adhered simply in wiping with dry cloth, and its manufacture approa

[0005]
[Means for Solving the Problem] The solution means of this invention for attaining the above-mentioned purpose is characterized by being formed in the top face of a minerals system base material in the minerals system panel to whi the laminating of a base coat layer, a pattern printing layer, and the topcoat layer was carried out one by one by the thermosetting resin coating with which said topcoat layer contains a fluorine radical. Since the topcoat layer is prepa in the top face of a pattern printing layer by the thermosetting resin coating containing a fluorine radical by consideri as this configuration, the antifouling property on the front face of a panel can improve, and dirt can be easily wiped o by wiping with dry cloth. Moreover, since a pattern printing layer is formed in the base coat side of a minerals system base material, without using a tissue, even if it uses for places equipped with a water supply, such as a sink, there is also no fall of adhesion, and even if used for the circumference of a gas range, it can consider as the anxious mineral system panel of thermal resistance and firesafety-proof which is not.
[0006] While laying the imprint sheet of a configuration of that said pattern printing layer was equipped with the pattern printing layer formed in one field of an imprint sheet base material so that the field and the base coat stratification plane of a minerals system base material which have said pattern printing layer may touch, after carryin out heating pressurization, it is characterized by being formed by exfoliating the imprint sheet base material of said imprint sheet. By carrying out like this, a directly minute pattern printing layer can be easily formed in the front face

a minerals system base material, without using a tissue.
[0007] The process which prepares the imprint sheet which carried out the laminating of the pattern printing layer fo one field of an imprint sheet base material, The process which paints a base coat layer to the field of a minerals syste base material, the process which lays and carries out heating sticking by pressure of the pattern printing layer of said imprint sheet so that the base coat layer of said minerals system base material may be touched, The process which forms a pattern layer in the base coat stratification plane of said minerals system base material by exfoliating the imprint sheet base material of said imprint sheet, By considering as the manufacture approach of a minerals system panel excellent in the antifouling property characterized by consisting of a process which forms a topcoat layer in sai pattern layer front face with the thermosetting resin coating containing a fluorine radical The minerals system panel excellent in the antifouling property which has the above effectiveness can manufacture certainly easily by imprint.
[0008]
[The mode of implementation of invention] Hereafter, the concrete operation gestalt of this invention is explained, referring to a drawing. The laminating sectional view in which drawing 1 shows the example of the minerals system panel of this invention, and drawing 2 are the laminating sectional views explaining an example of the manufacture approach of the minerals system panel of this invention. 1 -- a minerals system panel and 2 -- a minerals system base material and 3 -- a base coat layer and 3a -- a sealer layer and 3b -- a primer layer and 4 -- in a pattern ink layer and 5 topcoat layer and 6 express an imprint sheet and 7 expresses [a pattern printing layer and 4a / a solid ink layer and 4 an imprint sheet base material, respectively.
[0009] The configuration of the minerals system panel 1 of this invention consists of a configuration that the laminat of the pattern printing layer 4 and the topcoat layer 5 was carried out through the base coat layer 3 prepared in the fro face of the minerals system base material 2, as shown in drawing 1 . It is characterized by for the pattern printing lay 4 consisting of solid ink layer 4a and pattern ink layer 4b, having formed it in the field of the base coat layer 3 which consists of sealer layer 3a and primer layer 3b which were prepared in the top face of the minerals system base mater 2 with the replica method, and forming the topcoat layer 5 in the top face of this pattern printing layer 4 with the thermosetting resin coating containing a fluorine radical further.
[0010] Generally as a minerals system base material 2 used for the minerals system panel 1 of this invention, fiber cement boards, such as gypsum-fibrosum system plates, such as cement plates, such as a calcium silicate board, an asbestos cement sheet plate, a lightweight aerated concrete plate, and a hollow extrusion cement plate, a gypsum plat and a gypsum-fibrosum slag plate, a pulp cement board, an asbestos cement plate, and a cement chip board, are mentioned.
[0011] The base coat layer 3 A prevention of the alkali component elution from the minerals system base material 2 sake, And although it is prepared for the purpose of appearance of the feeling of a high design by said minerals syste base material 2, the adhesion of the pattern printing layer 4, and the metastatic improvement in the pattern printing layer 4, the configuration is arbitrary and it is good of course also as 1 lamination by the resin presentation equipped with the physical properties of above both As an approach of raising the quality engine performance, for prevention alkali component elution, poly isocyanate system resin, Sealer layer 3a which consists of hardenability resin, such as moisture hardening mold urethane system resin and styrene-acrylic ester copolymerization resin, It is desirable to consider as the two-layer configuration which consists of primer layer 3b which consists of acrylic urethane system resin aiming at the adhesion of the pattern printing layer 4 to the front face of the minerals system base material 2 an metastatic improvement, methacrylic ester system plastic paint, etc. Furthermore, the pattern printing layer 4 which gives concealment nature and is formed on a base material coloring and by making it opaque in primer layer 3b is ab to influence and carry out effect of the color of a lamination-ed base material.
[0012] As an imprint sheet 6 for forming the pattern printing layer 4 in the minerals system panel 1, what carried out the laminating configuration of the pattern printing layer 4 of arbitration is desirable to this polyolefine system resin stratification plane of the imprint sheet base material 7 with which the polyolefine system resin layer as a mold relea layer was formed in the whole surface at one side of tissue paper. As an imprint sheet base material 7, what is used a base material of the usual imprint sheets, such as papers, such as plastic film, such as a polyethylene film, a polypropylene film, and polyester film, and tissue paper, snow-white paper, or these complex films, is used, and wha carried out the laminating of the polyolefine system resin layers, such as polyethylene and polypropylene, to the top face of tissue paper is used preferably. In order to improve the thermal conductivity at the time of an imprint, the thinner possible one of the imprint sheet base material 7 is desirable, but if it becomes not much thin, a printability w fall that a base material tends to be extended at the time of printing of gravure etc. It is desirable to back tissue paper etc. and what coated tissue paper with 10-30-micrometer polyolefine system resin is the more nearly optimal than the field of a printability. Moreover, taking advantage of heat flexibility, an imprint can be made easy also at the shape o toothing of the front face of the minerals system base material 2 by using polyolefine system resin, such as polyethylene and polypropylene.
[0013] As a pattern printing layer 4, with solid ink layer 4a of whole surface solid printing, for example As a vehicle

the ink which pattern ink layer 4b expressing grain, texture, the surface shank of natural leather, a abstract shank, etc attached, and forms the pattern printing layer 4 The general-purpose resin which consists of an alkyd resin, urethane system resin, vinyl chloride system resin, etc. is used, and what mixed suitably coloring agents, such as a pigment of other additives, for example, organic, or an inorganic system and a color, the extender, the stabilizer, the plasticizer, solvent, etc. if needed further can be used.

[0014] The topcoat layer 5 formed in the maximum front face of the minerals system panel 1 excellent in the antifouling property of this invention is constituted by the thermosetting resin layer containing the fluorine radical which has a stain resistance prevention function. It is desirable to form the coat excellent in surface physical properti such as resistance to contamination, abrasion-proof nature, and solvent resistance, as transparence resin which forms the topcoat layer 5, and thermosetting resin, such as an unsaturated polyester resin, an epoxy resin, polyurethane syst resin, phenol resin, and melamine resin, is mentioned. 2 liquid hardenability urethane system resin which comes to a isocyanate compounds, such as tolylene diisocyanate, hexamethylene di-isocyanate, and meta-xylenediisocyanate, is preferably used for this as a curing agent using the polyol components (acrylic polyol, polyester polyol, polyether polyol, epoxy polyol, fluorine polyol, etc.) which have an OH radical as base resin especially. As the coating approa well-known coating means, such as a curtain flow coater, a roll coater, and a spray, can be used, and 20-50 microme is desirable as film thickness.

[0015] As thermosetting resin containing the fluorine radical which forms the topcoat layer 5, the fluoridation thermosetting resin which carried out addition mixing of the fluorine system compound of low molecular weight is included in the fluorine system thermosetting resin which comes to blend the poly isocyanate compound etc. with a fluoro olefin system polymer as a curing agent, and thermosetting resin.

[0016] The fluorine-containing copolymer which is 10 % of the weight or more of fluorine contents based on a fluor olefin unit as fluorine polyol resin which comes to blend the poly isocyanate compound etc. with a fluoro olefin syst polymer as a curing agent, and has meltable hydroxyl in a solvent is mentioned.

[0017] Moreover, it is the surfactant with which all the hydrogen atoms of an alkyl group have in a molecule the perphloroalkyl group, hydrophilic radical, or lipophilic group permuted by the fluorine atom as a fluorine system additive mixed to 2 liquid hardenability urethane system resin which forms the topcoat layer 5. And surface treatmen of resin is performed using the surface migration nature of this perphloroalkyl group, grouping of the perphloroalkyl group is carried out in the same intramolecular, surface orientation nature is raised, it shifts to a resin front face in lit addition, and fluorine reforming of the resin front face is carried out. as an addition of a fluorochemical surfactant, fluorine reforming of the resin front face is carried out by addition of the 0.5 - 1.0 weight section to resin solid conte - having -- 2 liquid hardenability urethane system resin front face -- water and oil repelling and antifouling-izing -- u adhering-izing.

[0018] Next, an example of the manufacture approach of the minerals system panel 1 of this invention is explained using a drawing. First, as shown in drawing 2 (b), the imprint sheet 6 with which the pattern printing layer 4 which consists of pattern ink layer 4b and solid ink layer 4a was formed in the top face of the imprint sheet base material 7 prepared. Next, the base coat layer 3 which consists of sealer layer 3a and primer layer 3b was formed in the top face the minerals system base material 2 as shown in drawing 2 (b). Next, as shown in drawing 2 (Ha) from the field of sa imprint sheet 6, it piles up so that it may counter with the base coat layer 3 in which the pattern printing layer 4 of th imprint sheet 6 was formed on the top face of the minerals system base material 2, and heating pressurization is carri out. Subsequently, as shown in drawing 2 (d), the imprint sheet base material 7 of said imprint sheet 6 is exfoliated, a the pattern printing layer 4 is formed in the 3rd page of the base coat layer of the minerals system base material 2. Furthermore, as shown in drawing 2 (e), by carrying out coating of the thermosetting resin containing a fluorine radi to the top face of the minerals system base material 2 containing this pattern printing layer 4, and hardening it on it, t topcoat layer 5 which has antifouling property is formed, and the minerals system panel 1 which is excellent in antifouling property is obtained.

[0019]

[Example]

Example 1 weighing-capacity 40 g/m2 Alkyd-resin system ink was used for the polyethylene resin stratification plan of the imprint sheet base material which carried out the coat of the polyethylene resin to tissue paper at the thickness 20 micrometers, the desired shank was printed with the gravure rotary press, and the imprint sheet was produced. Separately, it is moisture hardening mold urethane system plastic paint as a sealer layer to a calcium silicate board w a thickness of 3mm 30 g/m2 It applies and is acrylic urethane system plastic paint as a white primer layer further 100 g/m2 Coating was carried out and it dried for 20 minutes at 80 degrees C. Subsequently, it carries so that the pattern printing side of an imprint sheet may counter this white primer stratification plane, and they are the heating plate temperature of 135 degrees C, and the pressure of 15kg/cm2. Heating pressurization was carried out the condition fo minutes, and it imprinted. Applied to the pattern imprint side by the curtain flow coater so that film thickness might set to 20-30 micrometers (dry) in fluorine system acrylic urethane resin (the product made from Dainippon Ink

Chemistry, DEFENSA TR-310), and it was made to dry for 20 minutes at 80 degrees C after exfoliating the imprint sheet base material of said imprint sheet, and the minerals system panel which has antifouling property on a front fac was obtained.

[0020] Example 2 weighing-capacity 40 g/m2 Alkyd-resin system ink was used for the polyethylene resin stratificati plane of the imprint sheet base material which carried out the coat of the polyethylene resin to tissue paper at the thickness of 20 micrometers, the desired shank was printed with the gravure rotary press, and the imprint sheet was produced. Separately, it is moisture hardening mold urethane system plastic paint as a sealer layer to a calcium silica board with a thickness of 3mm 30 g/m2 It applies and is acrylic urethane system plastic paint as a white primer layer further 100 g/m2 Coating was carried out and it dried for 20 minutes at 80 degrees C. Subsequently, it carries so that the pattern printing side of an imprint sheet may counter this white primer stratification plane, and they are the heatin plate temperature of 135 degrees C, and the pressure of 15kg/cm2. Heating pressurization was carried out the conditi for 5 minutes, and it imprinted. applied the transparence coating which looked like [the 2 liquid hardenability acryli urethane resin 100 weight section] the imprint sheet base material of said imprint sheet in the pattern imprint side af exfoliate, and carried out 1 weight section mixing of the fluorochemical surfactant (the product made from Dainippo Ink Chemistry, DEFENSA MCF-323) by the curtain flow coater so that film thickness might be set to 20-30 micrometers (dry), and it was made to dry for 20 minutes at 80 degrees C, and the minerals system panel which has antifouling property on a front face was obtained.

[0021]

[Effect of the Invention] Since the topcoat layer is formed in the front face of a minerals system base material with th thermosetting resin containing a fluorine radical as explained above, the antifouling property of this invention on the front face of a panel can improve, and it can obtain cheaply the minerals system panel excellent in the antifouling property from which dirt can be easily dropped to wiping with dry cloth.

[0022] Moreover, since the direct pattern printing layer is prepared in the base coat stratification plane prepared in th front face of a minerals system base material by imprint, without using printing paper, even if it uses for places equipped with a water supply, such as a sink, there is also no fall of adhesion, and it can consider as the panel which problem of thermal resistance and firesafety-proof does not have, either, even if it uses for the circumference of a ga range, and can use as a chitin back panel.

[Translation done.]